

N/UWSS Domain Engineering



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Outline

SND C2 SPO

- **N/UWSS Business Process Reengineering**
- **ISC2 contract**
- **Requirements integration challenge**
- **Operational Architecture overview**
- **ISC2 product-line approach**
- **Summary**

Aggressively Pursuing JCS/DoD

Direction

SND C2 SPO

- **Aug 96: CINC formed full-time Tri-command Planning Cell (N/UWSS); 3-year charter**
 - **Driven by JCS/DoD direction**
 - **Incorporate CMU lessons learned**
- **Mission: Develop / implement the master plan for an integrated, interoperable future (2000-2010) BM/C2 system responsive to evolving NORAD/USSPACECOM mission needs**
- **Roadmap for developers**
 - **Requirements**
 - **Operational concept**
 - **Architectures**

Initiative vital to future NORAD/USSPACECOM mission accomplishment

Existing System Short Comings

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- **Limited interoperability between nodes / systems (especially those at different classification levels)**
- **Excessive operational costs due to antiquated equipment**
- **Lack of integrated air, missile and space displays**
- **Limited automatic planning capabilities**
- **Lack of Information Operations capabilities**
- **Lack of integration of space-derived information with land, sea and air forces**

Per N/UWSS CRD

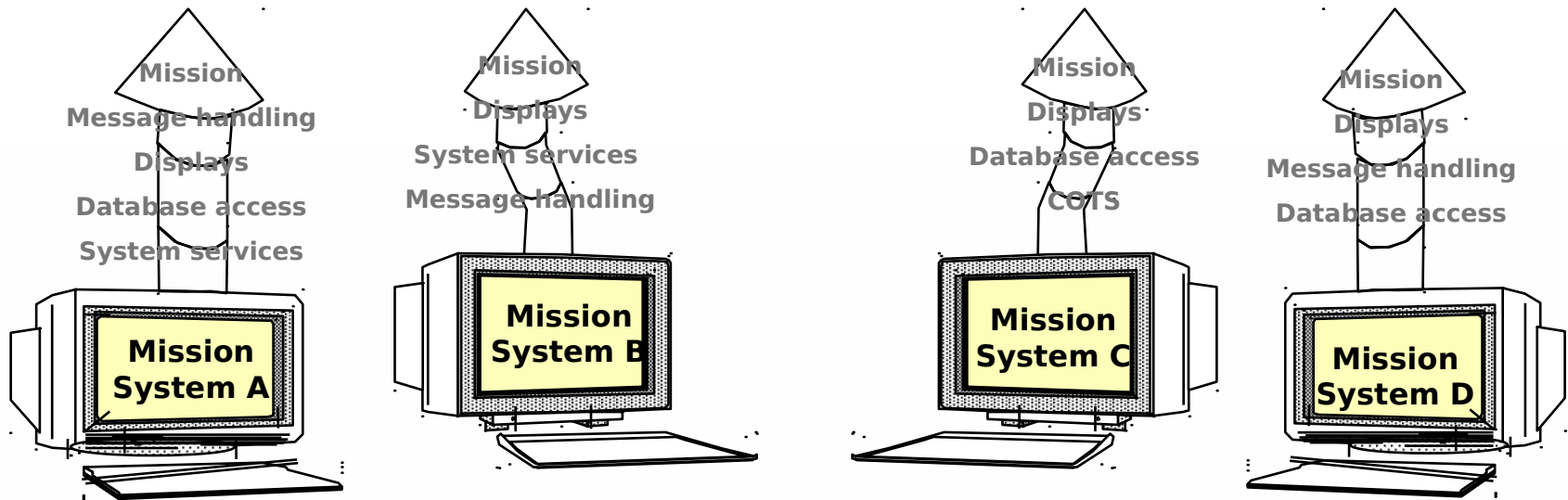
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The Problem

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STOVEPIPIPES OF AUTOMATION

- **Not conducive
to information
sharing**



**Warfighters:
Supporters:**

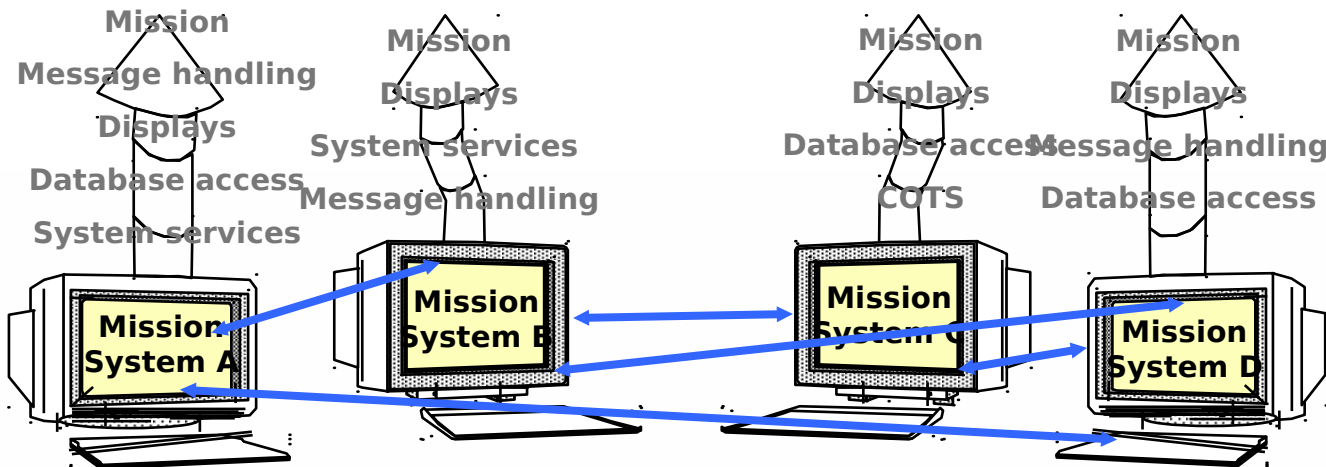
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**No fused battlespace picture
Multiple spares, training, lowered**

Problem Expanded

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Build “Interfaces”

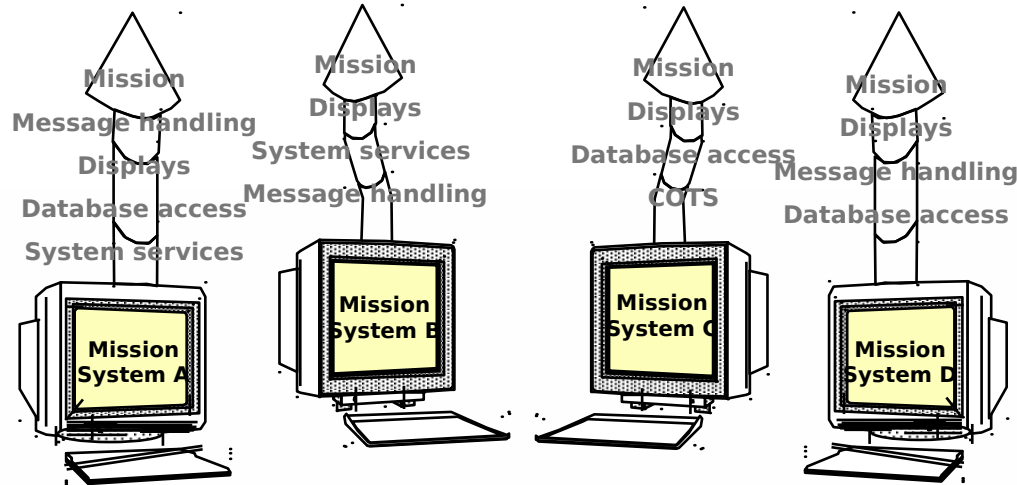


- To share information “interfaces” had to be built
- Nightmarish to maintain
- Cause inconsistent and unreliable data from multiple sources
- Negatively affects decision making
- Lack of goal alignment

The N/UWSS Solution

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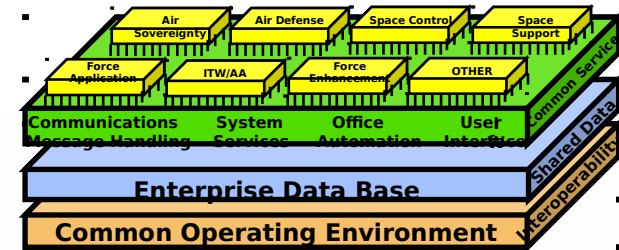
- **Stovepiped**
- **Non-Flexible**



As Is System Architectures

**R
E
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I
N
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I
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G**

- **Flexible**
- **Interoperable**



To Be System Objectives

**N/UWSS
Business Process Reengineering (BPR)**

N/UWSS Process

SND C2 SPO

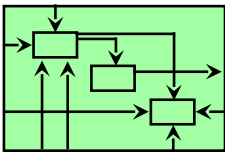
The Path to N/UWSS Business Case and POM Input

Part 1 Jan-Mar 97

As-Is Architecture

Operator Conducts:

Activity Modeling



Improvement Analysis

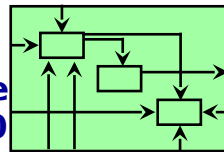


Activity Based Costing

Part 2 Apr-Jun 97

To-Be Architecture

Activity Modeling

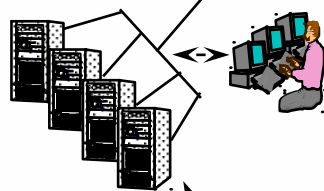


Policy Guidance

- Joint Vision 20
- CINCs Vision
- C4ISR Guidance

Operator Driven Reengineering

To-Be Integration



Information Infrastructure Assessment

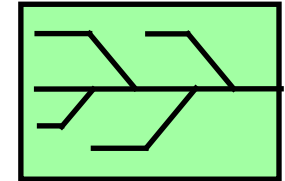
- As-Is System Architecture
- As-Is Data Structures

Migration Selection Criteria

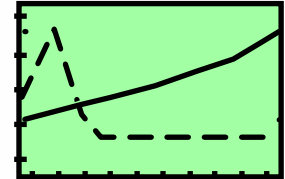
Part 3 Jul-Dec 97

Business Case Development

Migration Plan



Business Case



POM Input

PE XYZ
3600 00 01 02...
3400
3080

N/UWSS Team Accomplishments

FY97-98

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MNS: JROC Approved 18 May 98-Bi-National Joint Requirements



CRD: CINC Approved



Operational Architecture:

Activity Based Costing: Actual cost of CINC's fixed & endurable nodes



As-Is Activity Model & Analysis: Identified/categorized 360 activities



To-Be Activity Models & Analysis: Identified 600+ improvement areas



Ops Concept: 21st Century depiction of C2 node



IERs/Use Cases: Defines information flow and functions for CINC C2



Migration Plan: Decomposes mission areas into 58 initiatives



Business Case: Details investment costs, ROI, payback period



FY 00-05 POM: Ensures N/UWSS "plus-up" in USAF POM



Acquisition Strategy: Defined Top Level Tenets



N/UWSS Demonstration Lab: Validates Ops concepts/technology

Lab technical support: SPAWAR



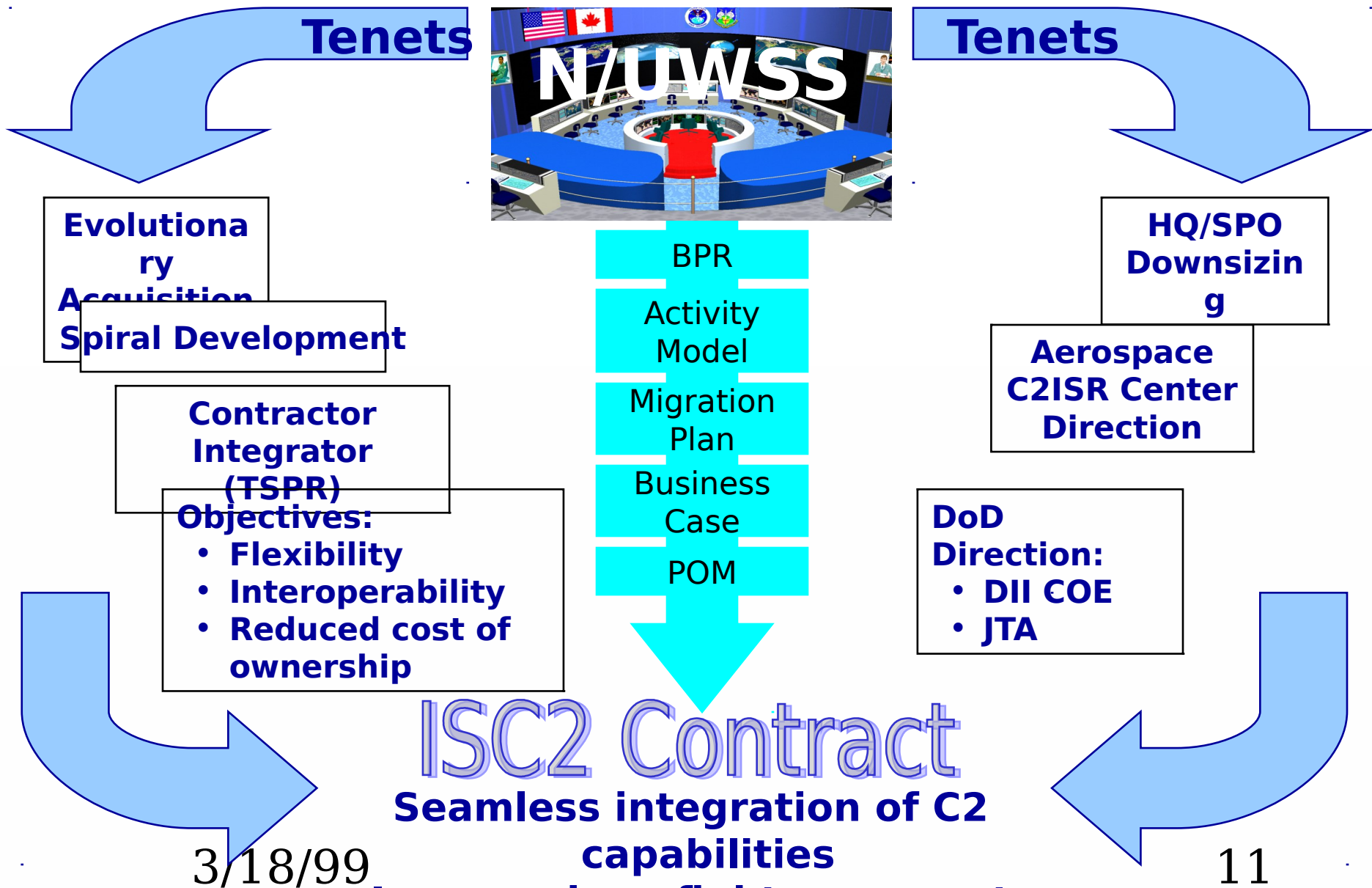
Outline

SND C2 SPO

- N/UWSS Business Process Reengineering
- **ISC2 contract**
- Requirements integration challenge
- Operational Architecture overview
- ISC2 product-line approach
- Summary

Integrated Space C2 Concept

SND C2 SPO



ISC2 Contract Scope

SND C2 SPO

System	Develop	Evolve	Sustain	D-level M/S	O-level M/S	Integration
CINC C2 Fixed Nodes						X
CMC Legacy			X	X	AFSPC	X
CMC Evolution (N/UWSS)	X	X	X	X	AFSPC	X
SPOC Legacy			X	X	AFSPC ¹	X
New HQ C2 Facility	X	X	X	X	AFSPC ¹	X
AMWC		X	X	X	Organic	X
Forward User interfaces		X	X	X	Various	X
Component C2 Nodes						X
SOC	X	X	X	Partial	AFSPC ¹	X
ARSPACE					N/A	Interop
NAVSPACE					N/A	Interop
R/SAOC					N/A	Interop
CINC Mobile Nodes		X	X	Partial	Organic	X
Communications	X	X	X	Partial	AFSPC	X
Training Support Systems	X	X	X	X	AFSPC ¹	X
External Integrations (e.g. SBIRS, NMD)					N/A	X

X SND C2 SPO Recommends inclusion

¹ AFSPC vehicles primary — ISC2

Issues to be resolved before inclusion into ISC2 scope

contract provides back-up

Needs closure to be in ISC2 scope

Various: Several existing contract

Agreed to be within ISC2 scope

vehicles

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Integrated Space Command & Control Contract

SND C2 SPO

- **Acts as a “Change Agent” to incrementally evolve NORAD, USSPACE, and STRATCOM C2 systems to an integrated C2 CONOPs and architecture**
 - Aggregate C2 resources on single contract
 - Single management structure where key trades are made
 - Fundamental trade-off between investing in the future versus maintenance release changes to legacy systems
 - Key success factor will be rapid and continuous C2 incremental deliveries
- **Changes Product, Process & People--Not Mission Integrity**
 - DII COE, JTA, C2 Product Line Architecture (N/UWSS, IC2S, GCCS)
 - TSPR, Reduced C2 cycle times, Spiral Development, CTF Testing, RTOC

The single most difficult and important step is getting this “Change Agent” in place--then--rapidly replacing existing infrastructure and culture with

Outline

SND C2 SPO

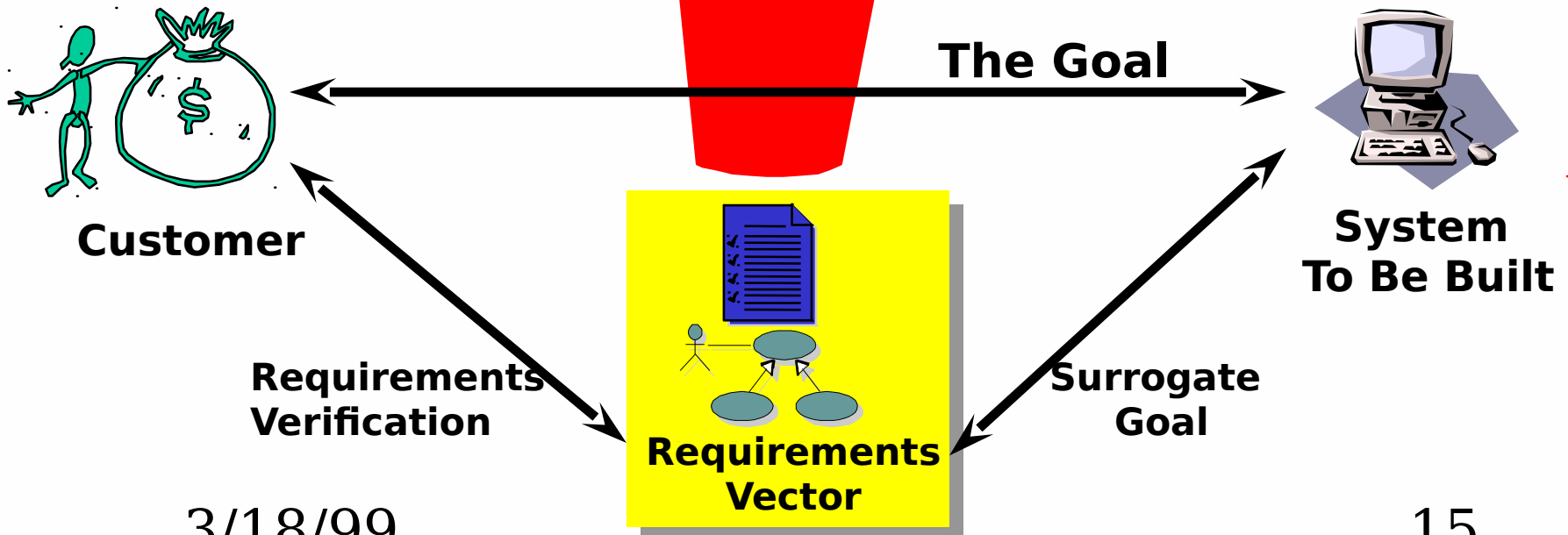
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ISC2 Requirements Integration Challenge

SND C2 SPO

RCM	CRD	ORD	MNS	CONOPS	MAP	Stds	Others
SOC PDS-M Air Migr MPDS-R	N/UWSS Sp Cntrl NMD	Space C2 CMU NMD NMD BMC3	N/UWSS	C2 Space Forces CMC Center AFI 13-SOC C2 NORAD Forces NMD GCCS (multiple)	Space Cntl Force Enh Space Sup Force Appl	C4ISR Frmwk JTA TAFIM DII COE C2STA	EO12958 CJCSI 6210

**How to specify/describe requirements
that the enterprise system
must meet?**

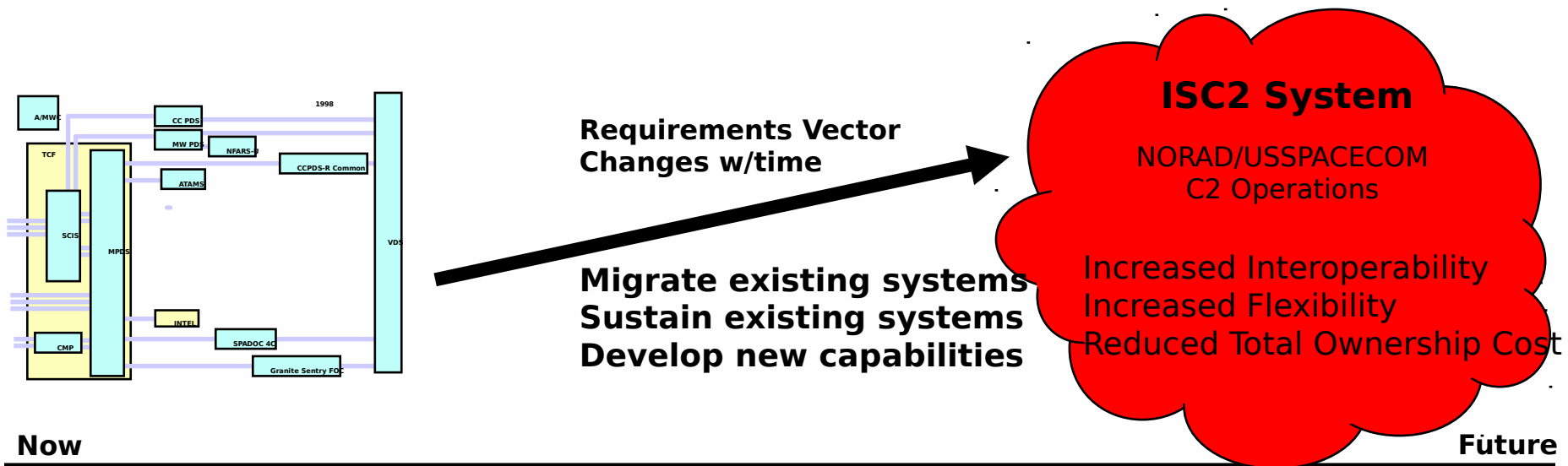


ISC2 Requirements Integration

SND C2 SPO

Challenge (continued)

- How do we solve
 - Lack of enterprise level requirements (integrated requirements view)
 - Lack of extensive and continuing user involvement
 - Lack of stable requirements
- How do we support evolutionary acquisition and spiral development
- How do we address reduced total ownership cost



ISC2 Requirements Integration

Challenge (continued) Requirements Vector

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	Type of requirement	Product
As Is System	System specifications	DOORS database
	System performance	J6C TPE
Operational Architecture Domain Requirements Model (DRM)	What must be done to perform the mission (improved mission effectiveness and efficiency) - Activities	IDEF0 Activity model
	What system support is required for mission accomplishment - Behaviors	UML Use Cases model
	Who talks to whom - Information flows required to accomplish or support a military operation	Node Connectivity Diagrams (NCDs)
	What they talk about - Information Exchange Requirements Specifics	IER Database
Technical Architecture	Standards (building codes)	Standards profile database (Access DB)
	System architecture objectives	Text description
System Maturity Matrix	Operational performance requirements	Time phased matrix of ORD level requirements
PRD	Contract performance requirements	Text descriptions

Outline

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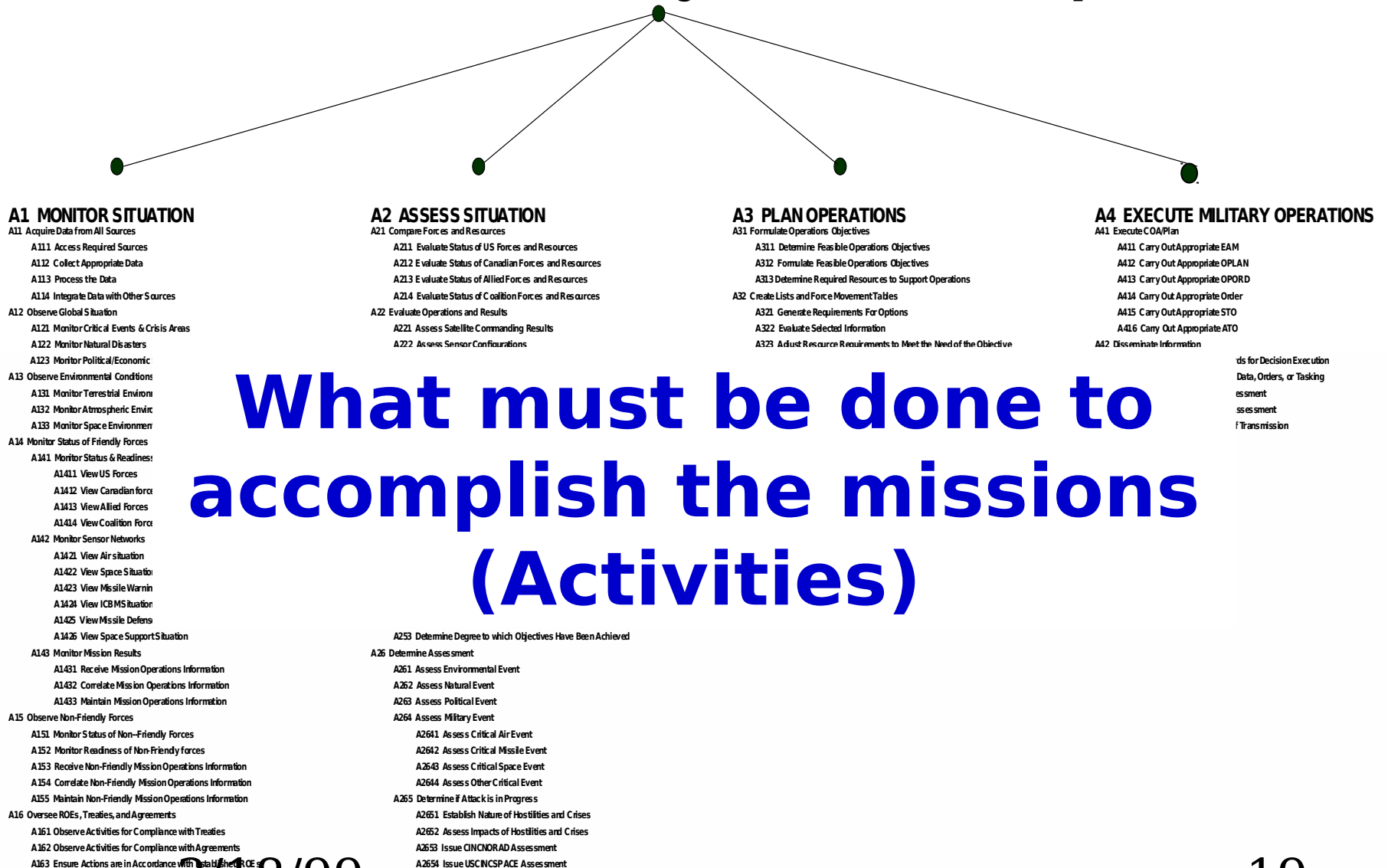
- N/UWSS Business Process Reengineering
- ISC2 contract
- Requirements integration challenge
- **Operational Architecture overview**

**What does our N/UWSS
Operational Architecture
(Domain Requirements
Model) show us?**

To-Be Activity Model

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Conduct CINC Level Battle Management/Command and Control Operations

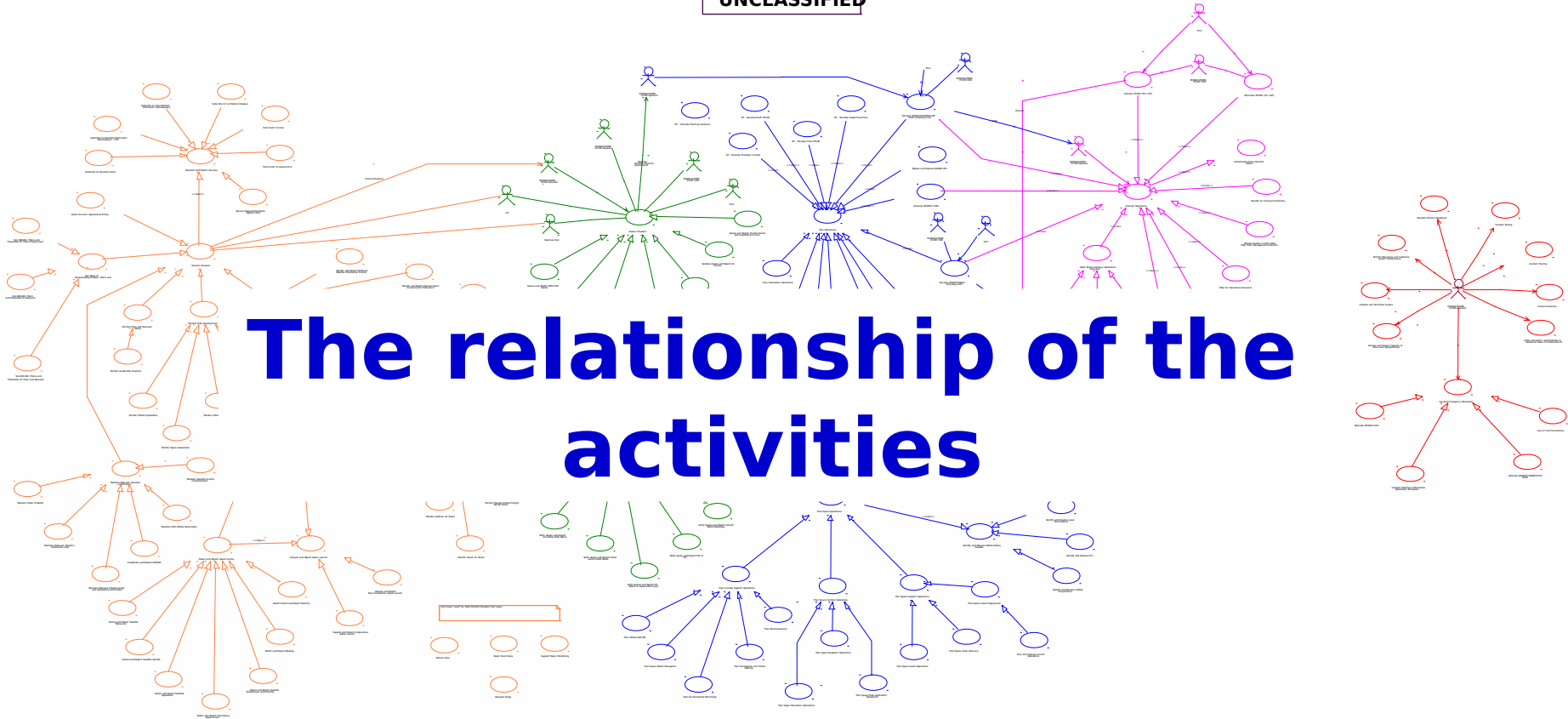


What must be done to accomplish the missions (Activities)

Top Level NCD Model

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Draft NUWSS-ISC2 Top Level
3-11-99

Monitor

Assess

Plan

Execute

Maintain
Readiness

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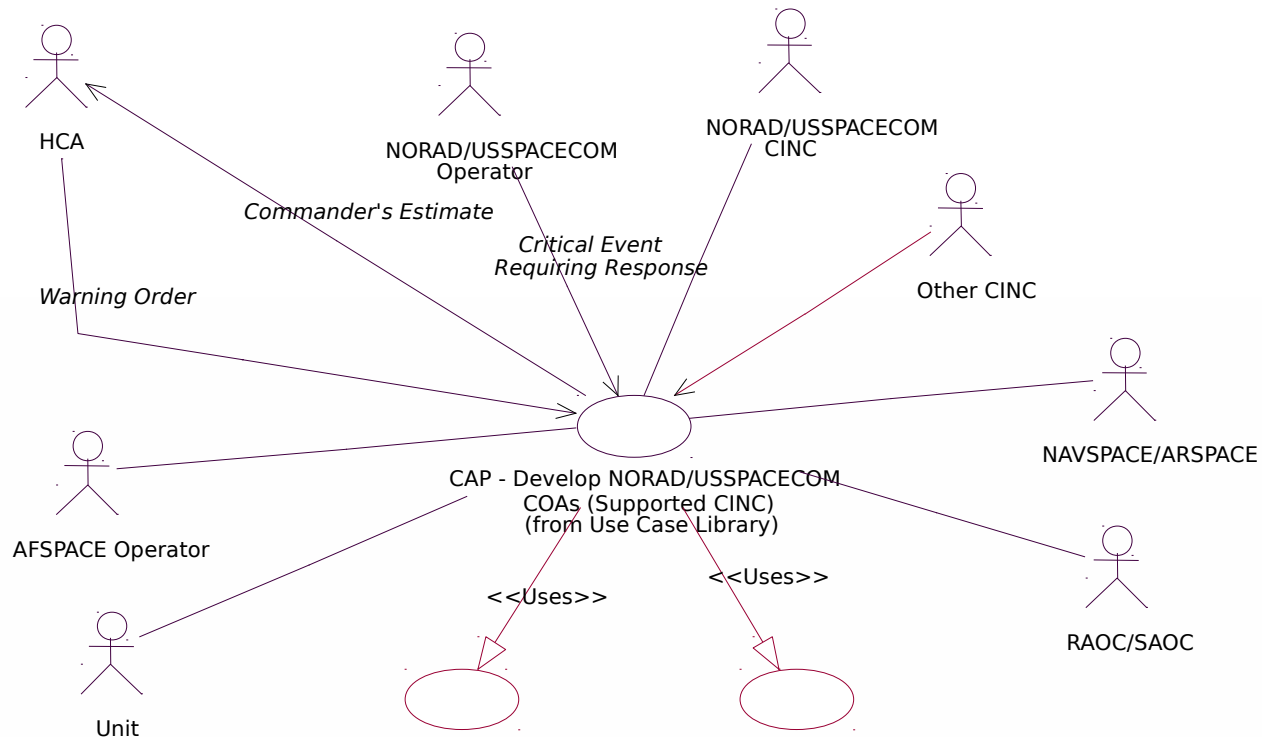
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Use Case Diagram

SND C2 SPO

Diagram: A3UCD6
Name: CAP - Develop NORAD/USSPACECOM COAs (Supported CINC) UCD
Initial Creation Date: 12-11-98
DB Integration Date:
Rev Date: 1-22-99

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What system support is required to accomplishment

Use Case Specification

SND C2 SPO

CAP - Develop NORAD/USSPACECOM COAs (Supported CINC)

Scope

(U) NORAD/USSPACECOM receives a Warning Order and develops Courses of Action to support the Warning Order and sends to HCA for review and approval.

Summary

(U) The stimulus is a Warning Order from HCA (NCA). NORAD/USSPACECOM performs internal planning and directs Components and Other CINC to provide COA information. NORAD/USSPACECOM integrates all information and provides NCA with COAs in support of the Warning Order.

Actors

(U) HCA, RAOC/SAOC, *12, Other CINC, AFSPACE, NAVSPACE/ARSPACE, Unit

Preconditions

(U) A situation exists in an CINC AOR that is under the assessment of HCA (NCA/CJCS).

(U) An assessment occurs to require a change in active COAs.

(U) A request for support from other CINC's causes need to change active COAs.

Primary Transactions

- (U) HCA (CJCS) sends a Warning Order to NORAD/USSPACECOM due to a condition in a CINC AOR. (CC127 Warning Order (Request for COAs) from HCA). The Warning Order directs the development of COAs in response to the situation. The system alerts the operator that the Warning Order has been received. By interacting with the alert, the operator may gain access to the Warning order.

(U) The NORAD/USSPACECOM Operator subscribes to assessments that require planning actions. When such an assessment occurs, the system alerts the operator and provides detailed information as to the nature of the assessment and action required.

(U) Other CINC's requests additional or modified space support. The NORAD/USSPACECOM operator uses the system to integrate and prioritize incoming requests that require changes to active COAs.
- (U) The NORAD/USSPACECOM Operator uses A3 Plan Operations steps 1-3 to develop the CINC's Objectives for the potential operation or operation change.
- (U) To develop COAs, the NORAD/USSPACECOM operator requests (with the Evaluation Request Message) components and Other CINC's to identify COAs with forces and resources that address the objectives being considered. NORAD/USSPACECOM guidance outlining the objectives and other planning considerations is also passed (CC129 Evaluation Request from NORAD/USSPACECOM).

- (U) If time and security considerations permit, subordinate evaluation of tentative COAs is valuable. The AFSPACE Operator may request units to evaluate AFSPACE COAs under development (CC131 Evaluation Request from AFSPACE).
- (U) Subordinate commands and UNIT's will provide response to COA options via an Evaluation Response Message (CC132 Evaluation Response to AFSPACE).
- (U) Components and Other CINC's respond to the NORAD/USSPACECOM with an Evaluation Response Message (CC128 Commander's Estimate/Evaluation Response (Recommended COAs) to NORAD/USSPACECOM).
- (U) Alternative COAs are evaluated and forces are identified to support the operation as well as specific component/theater concerns. The NORAD/USSPACECOM Operator uses A3 Plan Operations steps 4-11 to formulate and select COAs for presentation and recommendation.
- (U) The NORAD/USSPACECOM Operator uses A4 Make Force Employment Decisions to present the COA(s) to the NORAD/USSPACECOM CINC who ultimately approves one or more COAs for consideration by the HCA.
- (U) The NORAD/USSPACECOM Operator uses the system to consolidate all information and prepare the Commander's Estimate, the recommended COA(s), and sends it to HCA for review and approval (CC135 Commander's Estimate (Recommended COAs) from NORAD/USSPACECOM).

Postconditions

(U) NORAD/USSPACECOM provides recommended COAs to HCA.

Alternate Transactions

NA

User Interface

NA

Participating Objects

1. NA

References

(U) Joint Pub 5-03.1 (to be published as CJCSM 3122.01), Planning Policies and Procedures (JOPES Volume I)

Notes

Narrative description and specifics about system behavior

Low-Level Node Connectivity Diagram

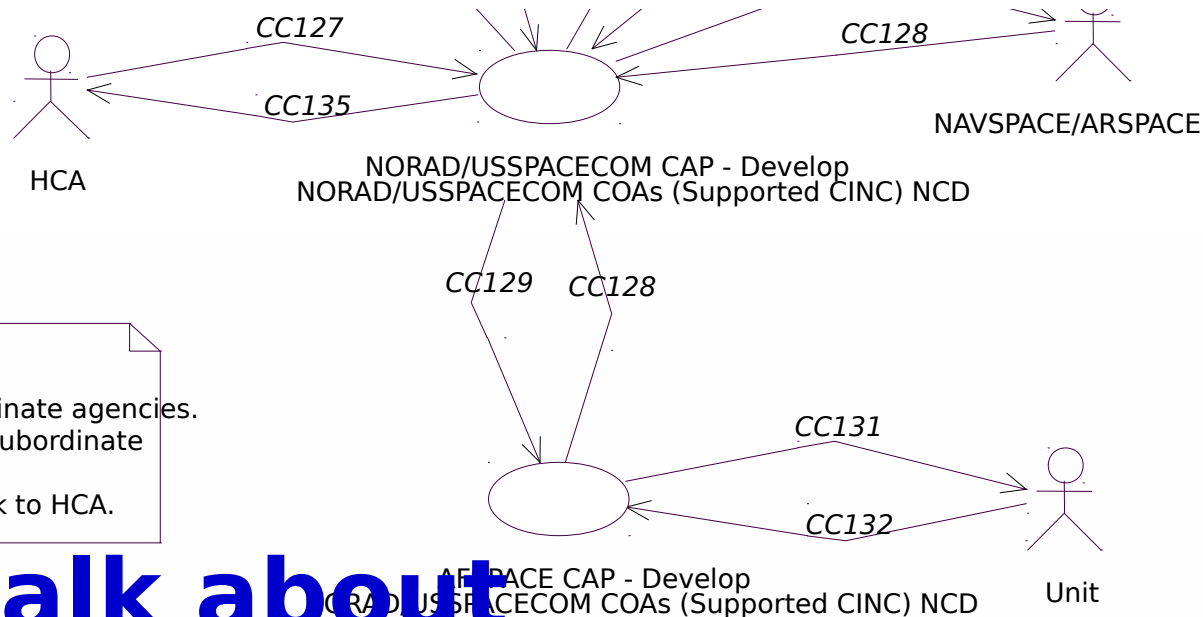
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Diagram: A3NCD6
Name: CAP - Develop NORAD/USSPACECOM COAs (Supported CINC) NCD
Initial Creation Date: 7-21-98
DB Integration Date: 11-2-98
Rev Date: 11-4-98



Who talks to whom

NOTE:
Supporting: CC135 to Other CINC as opposed to HCA, CCx1 request for COAs, delete CC128, CC129 to Other CINC



Flow:
Receive Warning Order from HCA.
Generate Evaluation Request and send to subordinate agencies.
Receive Commander's Estimate/Evaluation from subordinate agencies.
Analyze responses and send recommendations back to HCA.

What they talk about

- (1) CC127 - Warning Order (Request COAs) from HCA
- (2) CC129 - Evaluation Request from NORAD/USSPACECOM
- (3) CC131 - Evaluation Request from AFSPACE
- (4) CC132 - Evaluation Response to AFSPACE
- (5) CC128 - Commander's Estimate/Evaluation Response (Recommended COAs) to NORAD/USSPACECOM
- (6) CC135 - Commander's Estimate (Recommended COAs) from NORAD/USSPACECOM

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Outline

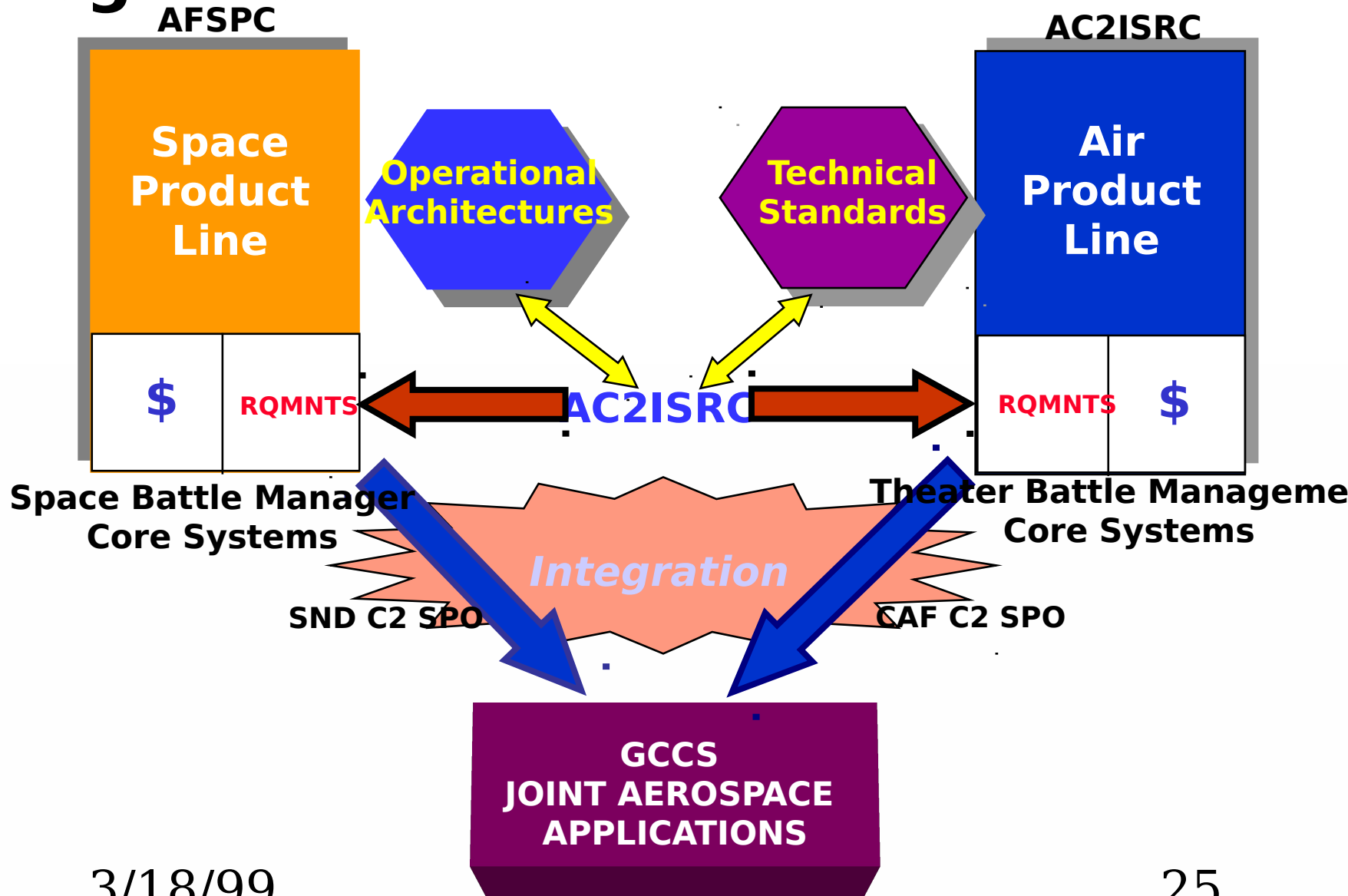
SND C2 SPO

- N/UWSS Business Process Reengineering
- ISC2 contract
- Requirements integration challenge
- Operational Architecture overview
- **ISC2 product-line approach**
- Summary

AFSPC Vision for Air and Space

Integration

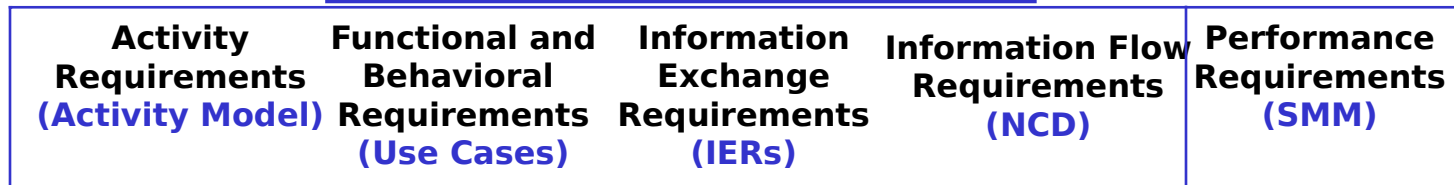
SND C2 SPO



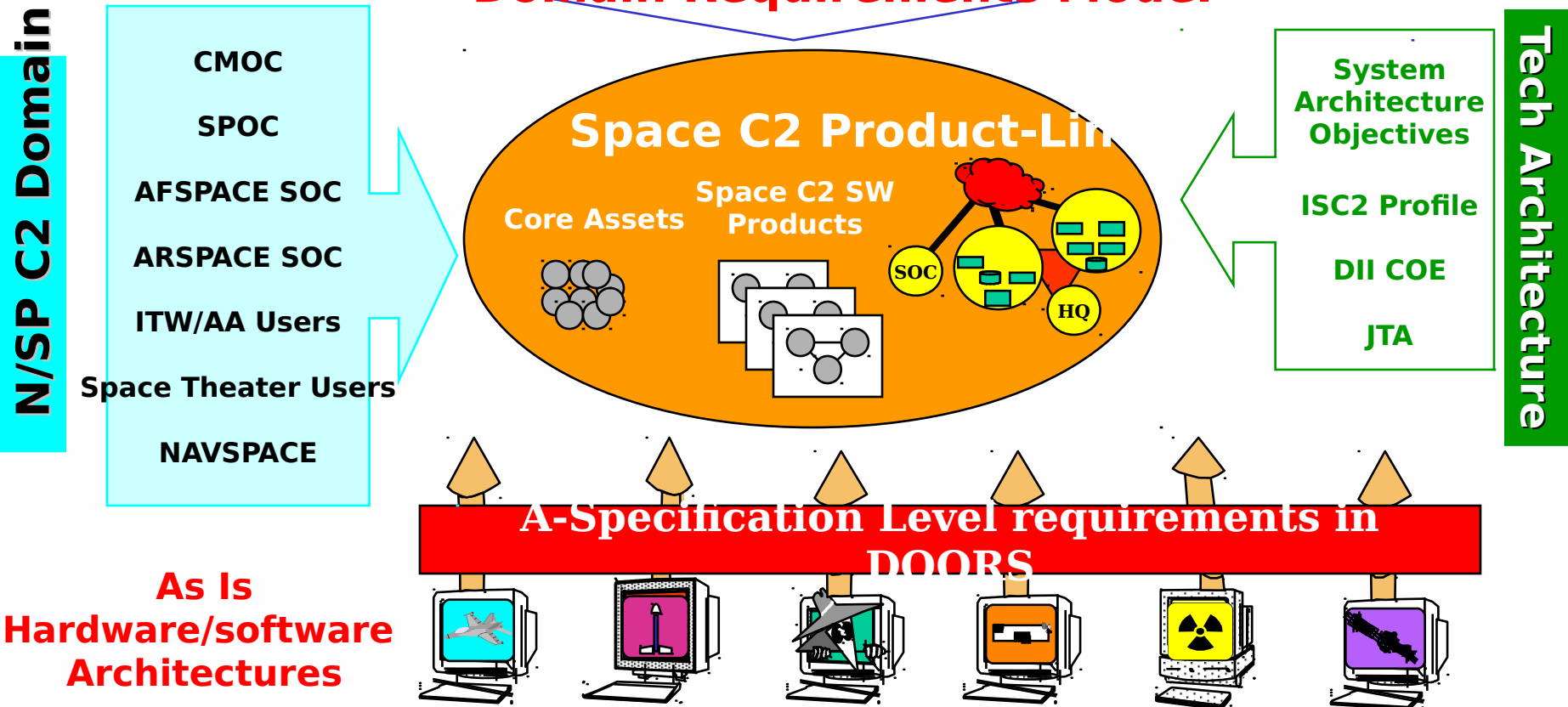
ISC2 Product-Line Architecture Development

SND C2 SPO

Operational Architecture



Domain Requirements Model



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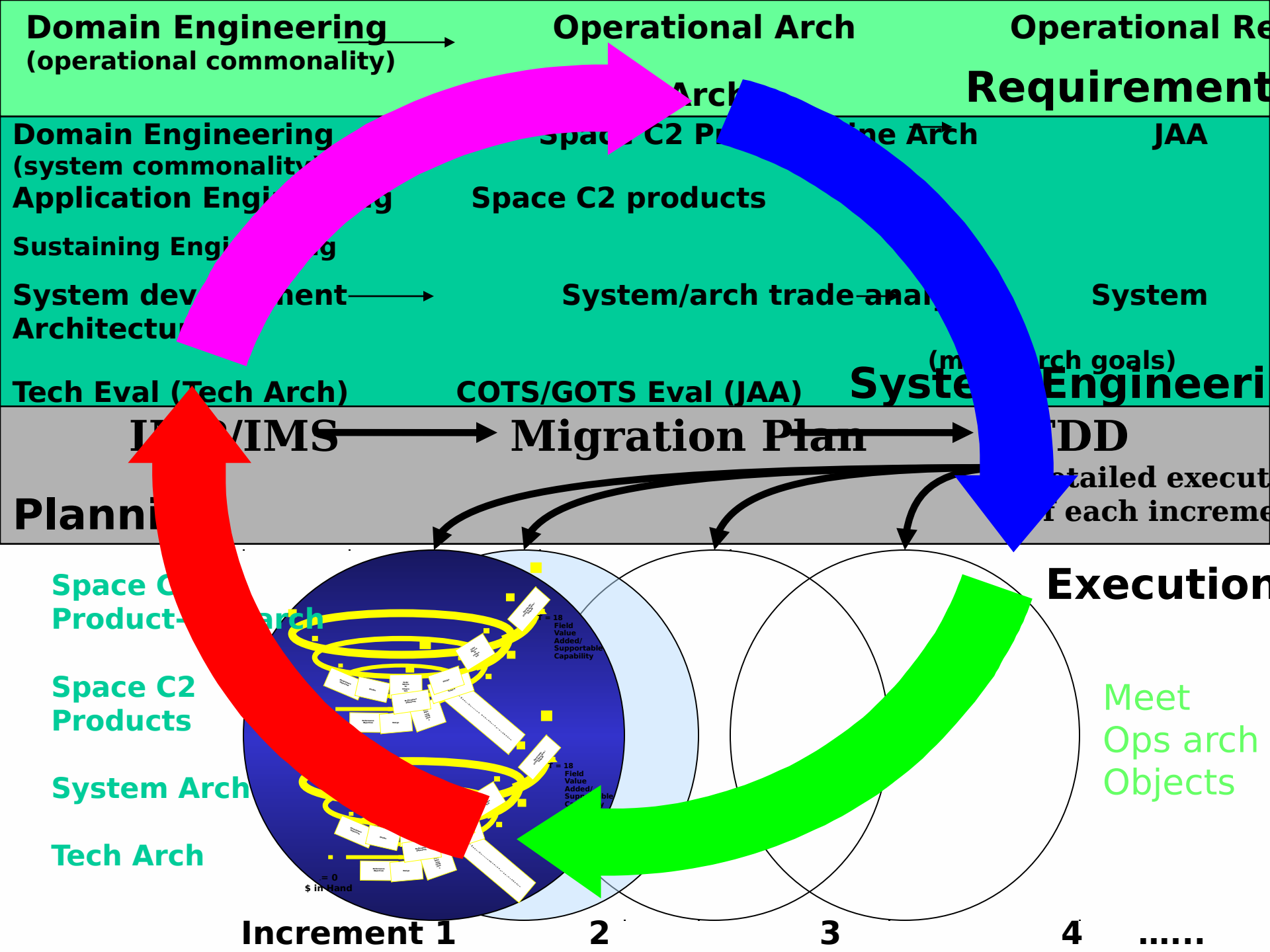
Sustainment/Migration Systems/Reengineering/Minin

Finding Common Space C2

products

SND C2 SPO

- **Commonality among Mission operation centers**
 - **AFSPACE SOC**
 - **ARSPACE SOC**
 - **NORAD Command Center (Cheyenne Mountain)**
 - **USSPACECOM Operations Center (SPOC)**
 - **New C2 command center (SPOC evolution)**
 - **Mobiles**
- **Commonality between strategic and tactical operations**
- **Commonality among external NORAD/ USSPACECOM Actors**
 - **Requires domain analysis to determine space C2 product-line requirements**



Outline

SND C2 SPO

- N/UWSS Business Process Reengineering
- ISC2 contract
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- **Summary**

Summary

SND C2 SPO

- **N/UWSS program provides**
 - **Vision (goals, objectives) for future NORAD/USSPACECOM BM/C2 capabilities**
 - **An integrated set of operational requirements within the Operational Architecture (Domain Requirements Model)**
- **ISC2 will be the contractual vehicle for N/UWSS**
- **ISC2 is a evolution project not a new start**

Summary

SND C2 SPO

- **ISC2 contractor will provide**
 - **Space C2 product-line core assets and products for inclusion in the JAA**
 - **As Is System evolutionary strategy**
 - **Systems Architecture and Systems built with**
 - **Space C2 products**
 - **Other Joint Aerospace Applications (JAA)**
 - **Technical Architecture compliant platforms and infrastructure**

Summary

SND C2 SPO

- **Lessons Learned**
 - **Domain engineering requires “deep” domain (mission) knowledge**
 - **Complexity of integrating architecture products increases with breadth of domain**
 - **Users understanding of architecture products/models is essential - plan for adequate (interactive) coordination time**

Summary

SND C2 SPO

- **Benefits**
 - **Operational architecture, Domain Requirements Model, provides an ability to manage complexity.**
 - **Provides an integrated view of the mission domain requirements**
 - **Exploits human visual processing abilities and intuition**
 - **Captures requirements from user perspective**
 - **Identifies the role of the users of the system.**
 - **Supports automation of architecture driven implementation and testing**
 - **Promotes iterative (spiral) development**
 - **Supports domain engineering activities in exploiting commonality for product-line development**

Backup Slides

SND C2 SPO

Meeting the Warfighter's Needs

SND C2 SPO

JOINT VISION
2010

N/UWSS Improves CINC's BM/C2 for ALL Future Mission

NORAD &
USSPACECO

Air & Space
Control for N.

Space and
Missile Warning

North
American
Missile

Combat Support
Operations

Space
Operations

Other Support

Smart
Push
Warfight
er Pull

Improved
Theater CINC

Shared Warning

Theater Ballistic
Missile Defense

Precision Strike

Battlefield
Information

Protect AOR Space
Resources

Negate Threat to
AOR from Red
Forces

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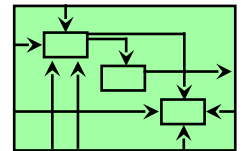
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As-Is Architecture

SND C2 SPO

- **Create As-Is Architecture**
 - **CMOC Crew created**
 - **Activity Model**
 - **Improvement Opportunities (450)**
 - **Activity Based Costing (ABC)**
- **Validate and Add to As-Is Architecture**
 - **Another CMOC Crew**
 - **Improvement Opportunities (150)**
- **Effort**
 - **One man-year from CMOC Crews**
 - **Two+ man-years from N/UWSS Team**
 - **Produced volumes of Functional Improvement Reports**

Activity Modeling



Improvement Analysis

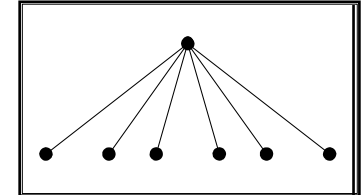


To-Be Architecture

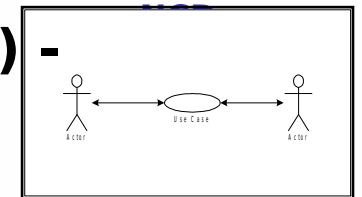
SND C2 SPO

- **Effort**
 - Several weeks from CMOC Crews
 - Six man-months from N/UWSS Team
- **Products**
 - **To-Be Node Tree (Activity Model)**
 - **High-Level Use Case Overview**
 - **Node Connectivity Diagrams (NCDs) - 144**
 - **Information Exchange Requirements (IERs) - 885**
 - **Use Case Diagrams & Descriptions - 144**

To-Be Node Tree

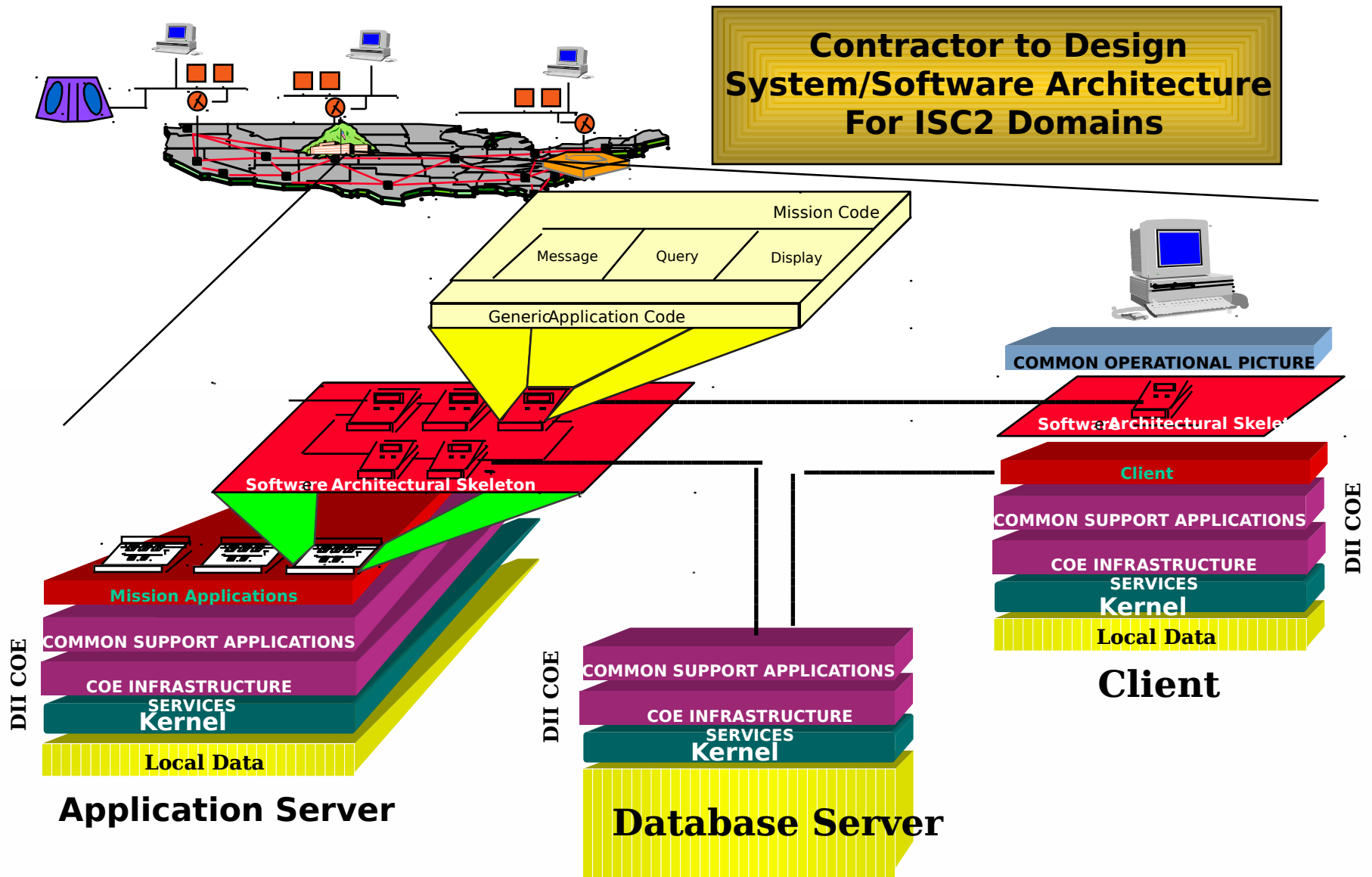


Low-Level



System Complexity

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CMU LESSONS LEARNED

SND C2 SPO

- **Integration**
- **Acquisition strategy must manage the risk of “changing an engine in flight”**
- **“System of Systems” can’t be six independent programs/contracts with sporadic systems engineering/planning**
- **Lack of system level documentation-- multiple SORDs vs system level CRD & CONOPS**
- **Lack of extensive user involvement up front**

Operational Architecture

SND C2 SPO

Contents

- **Developed by NORAD/USSPACECOM**
- **Describes tasks and activities, operational elements and information flows, incorporates and is driven by doctrine, and is not systems dependent**
- **Describes target for migrating existing systems**
- **Operational Architecture Products**
 - **Activity Model**
 - **Use Case Model**
 - **Operational Node Connectivity Descriptions (NCD)**
 - **Operational Information Exchange Requirements (IER)**

What is a Use Case?

SND C2 SPO

Key Words and Phrases

*A use case
defines a
sequence of
interactions*

*between
actors & a
system*



Describes functions of the system

that yields an

*observable
result of
value*



To avoid too detailed use cases

to a

an actor



To avoid too complex use cases

Use Case Description example

SND C2 SPO

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2. (U) The NORAD/USSPACECOM Operator uses A3 Plan Operations steps 1-3 to develop the CINC's Objectives for the potential operation or operation change.
3. (U) To develop COAs, the NORAD/USSPACECOM operator requests (with the Evaluation Request Message) components and Other CINC's to identify COAs with forces and resources that address the objectives being considered. NORAD/USSPACECOM guidance outlining the objectives and other planning considerations is also passed (**CC129** Evaluation Request from NORAD/USSPACECOM).

4. (U) If time and security considerations permit, subordinate evaluation of tentative COAs is valuable. The AFSPACE Operator may request units to evaluate AFSPACE COAs under development (**CC131** Evaluation Request from AFSPACE).
5. (U) Subordinate commands and UNIT's will provide response to COA options via an Evaluation Response Message (**CC132** Evaluation Response to AFSPACE).
6. (U) Components and Other CINC's respond to the NORAD/USSPACECOM with an Evaluation Response Message (**CC128** Commander's Estimate/Evaluation Response (Recommended COAs) to NORAD/USSPACECOM).
7. (U) Alternative COAs are evaluated and forces are identified to support the operation as well as specific component/theater concerns. The NORAD/USSPACECOM Operator uses A3 Plan Operations steps 4-11 to formulate and select COAs for presentation and recommendation.
8. (U) The NORAD/USSPACECOM Operator uses A4 Make Force Employment Decisions to present the COA(s) to the NORAD/USSPACECOM CINC who ultimately approves one or more COAs for consideration by the HCA.
9. (U) The NORAD/USSPACECOM Operator uses the system to consolidate all information and prepare the Commander's Estimate, the recommended COA(s), and sends it to HCA for review and approval (**CC135** Commander's Estimate (Recommended COAs) from NORAD/USSPACECOM).

Post-Conditions

(U) NORAD/USSPACECOM provides recommended COAs to HCA.

Alternate Transactions

NA

User Interface

NA

Participating Objects

1. NA

References

(U) Joint Pub 5-03.1 (to be published as CJCSM 3122.01), Planning Policies and Procedures (JOPES Volume I)

Notes

N/UWSS IER Example

SND C2 SPO

Operational Architecture Repository - [IERCoreDataTbl]

File Edit View Insert Format Records Tools Window Help

IER FORM IER Classification Level: Unclassified

Filter Modified Since Reading Room: No Built By Dacom

IN146 Launch Assessment (Preliminary) from NORAD/USSPACEC

IER Purpose
Supports the CINC's Space Operations and Warning missions by providing timely assessments of space and missile launch events.

IER Content
Includes event time, location, type, azimuth or inclination, vehicle type, and preliminary mission and/or payload type. May also include orbital elements.

IER Timeliness
Immediate

IER Reliability
99.9%

IER Size
one page

IER Frequency
Approximately 10 per month (peacetime); multiple events per day (crisis/war).

IER Potential Change
Increase anticipated through the year 2010.

IER Min Security Classification Secret **IER Max Security Classification** Secret

IER Media Comments
Voice, electrical message, chatter

IER Comment

Link To Other IER's
Yes
Survivability Rqmt: Yes
IER Status:

Nature of Link
Contributing factor for IN144,150,148,154

Interoperability Rqmt

IER Classification Comment:

Producing Node(s)
Producing Node(s)
NORAD/USSPACECOM

Consuming Node(s)
Consuming Node(s)
AFSPACE
COMBATANT COMMAND
HCA
NATIONAL_INTEL/CIC
NAVSPACE/ARSPACE
NON_DOD_GOVERNMENT
NORAD/USSPACECOM

Close Find Associated NCDs Add Node

Start Exploring - Final FEA - Jun... Inbox - Microsoft Outlook Microsoft PowerPoint - [N... Operational Architect... 9:04 AM

3/18/99

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ISC2 Technical Architecture (TA)

SND C2 SPO

- **Provides a framework for the contractors technical architecture**
- **Represents the implementation of the JTA and DII COE for the Scope of the ISC2 contract**
 - **Time phased**
 - **Includes legacy standards**
- **Represents the implementation of the DII Air Force, AFCA and AC2ISRC guidance/requirements**
- **Provides technology forecasting**

ISC2 System Architecture

SND C2 SPO

Objectives

- **Comply with Integrated Command and Control System (IC2S)**
- **N/UWSS Enterprise Database**
 - n-tier, C2STA DAIM, SHADE, CADM, XML
- **Virtual Command Center**
 - Location independence
- **Enterprise Workstation**
 - Thin or Thick clients, COP with Space views
 - Accessibility to multiple missions
- **Information Pipeline**
 - QoS, Robust, Survivable Thinline
- **Product Line Architecture**
 - Distributed Component Technology
 - Composable
 - Adaptable to QoS

System Maturity Matrix (SMM)

SND C2 SPO

- **Being developed by AFSPC/DR**
- **Provides the integrated view of performance characteristics needed by the operators**
- **Contractor baselines for each evolutionary increment (time phased compliance)**
- **Consolidates requirements references(ORDs, 1067s, etc.) of legacy systems.**
- **When coupled with operational and technical architecture provides the system's performance baseline**

CLAS	AFDD 1-1 Task	IDEF Task #	Mission	Requirement	Source Ref	Performance Characteristics				
						Threshold	Objective	Increment #1 CY20XX	Increment # 2 CY20XX	Increment #3 CY20XX
				Execute						
U	4	A42	ALL	(U) From time of force status/situation change notification, direct near-realtime reconfiguration of strategic missile warning space forces, reference AFSPACE SOC RCM (4.1.5.a).	Space C2 RCM 9.a		(U) 2 minutes	(U) 2 minutes		
				Information Service						
(U)	XXX	XXX	ALL	(KKP) Operating configurations: Simultaneously process real and non-real information without crossover of information	14 AF SOC AF FORM 1067 w/RCM, 13 Jul 98	yes	yes			
				Other						
U	XXX	XXX	ALL	U) Share data and integrate processes to optimize operational task accomplishment across C2 echelons for NORAD/USSPACECOM C2 and full force integration	Space C2 RCM 10: N/UWSS CRD					
			ALL	U) Manual data entry is required only once across C2 echelons (4.3.1.1).	Space C2 RCM 10.a: N/UWSS CRD		(U) 95% of data entry	(U) TBD		

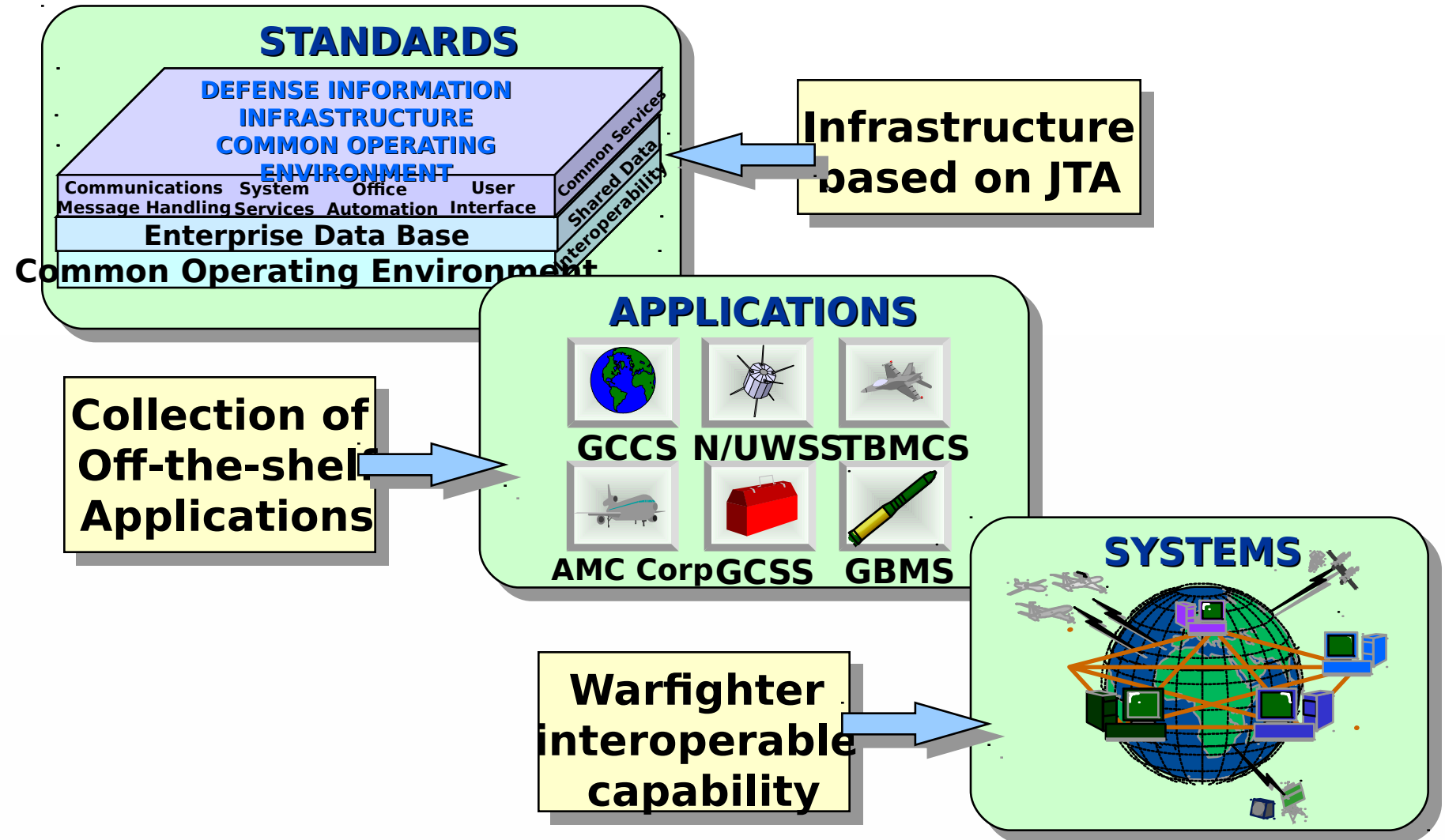
Ops Arch Objectives

SND C2 SPO

- **To effectively build an:**
 - **Interoperable,**
 - **Flexible, and**
 - **Cost-effective Military System**
- **To migrate to a DII COE environment**
- **To prevent future stovepiped systems**

Standards Based Approach

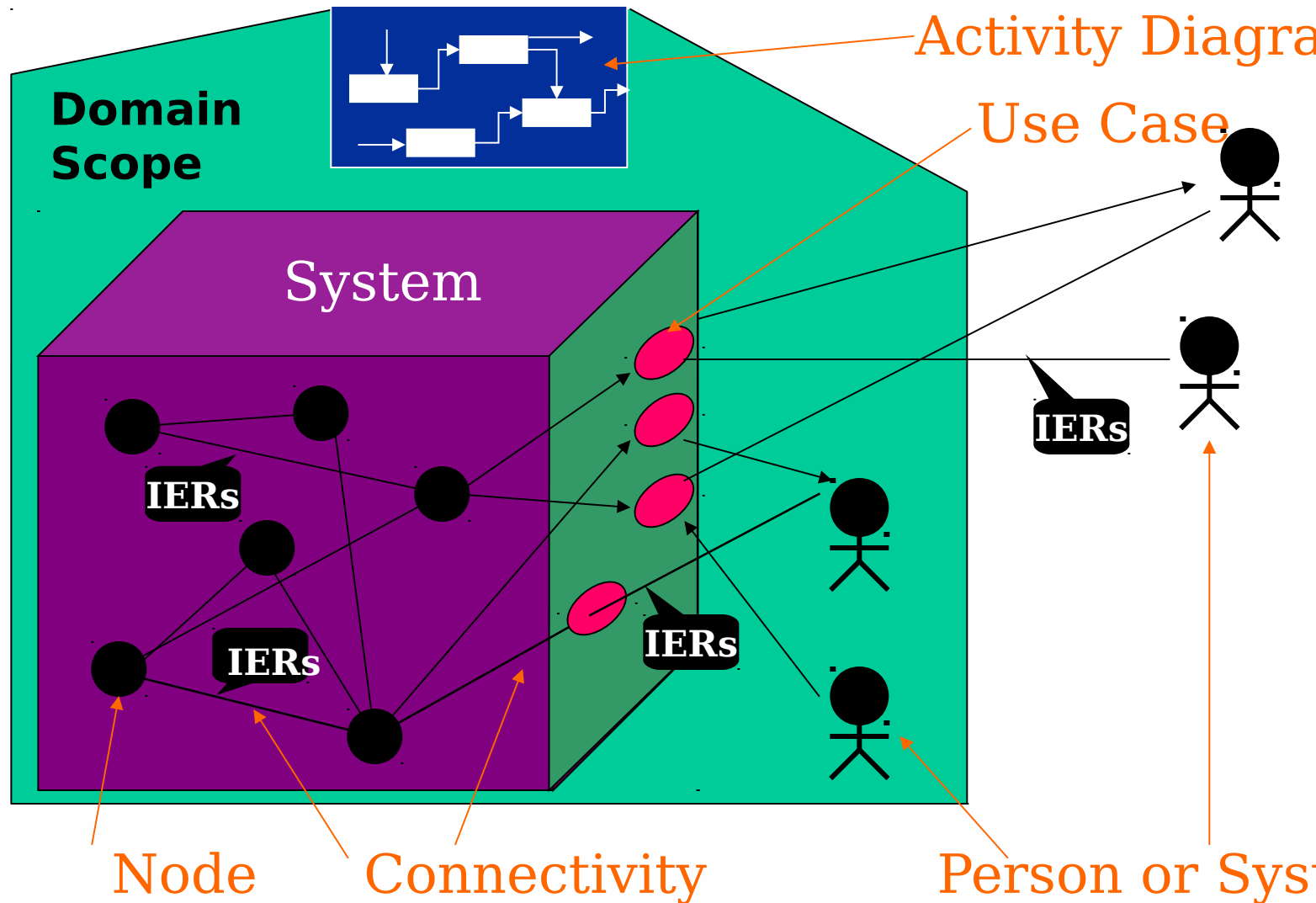
SND C2 SPO



Element Relationships

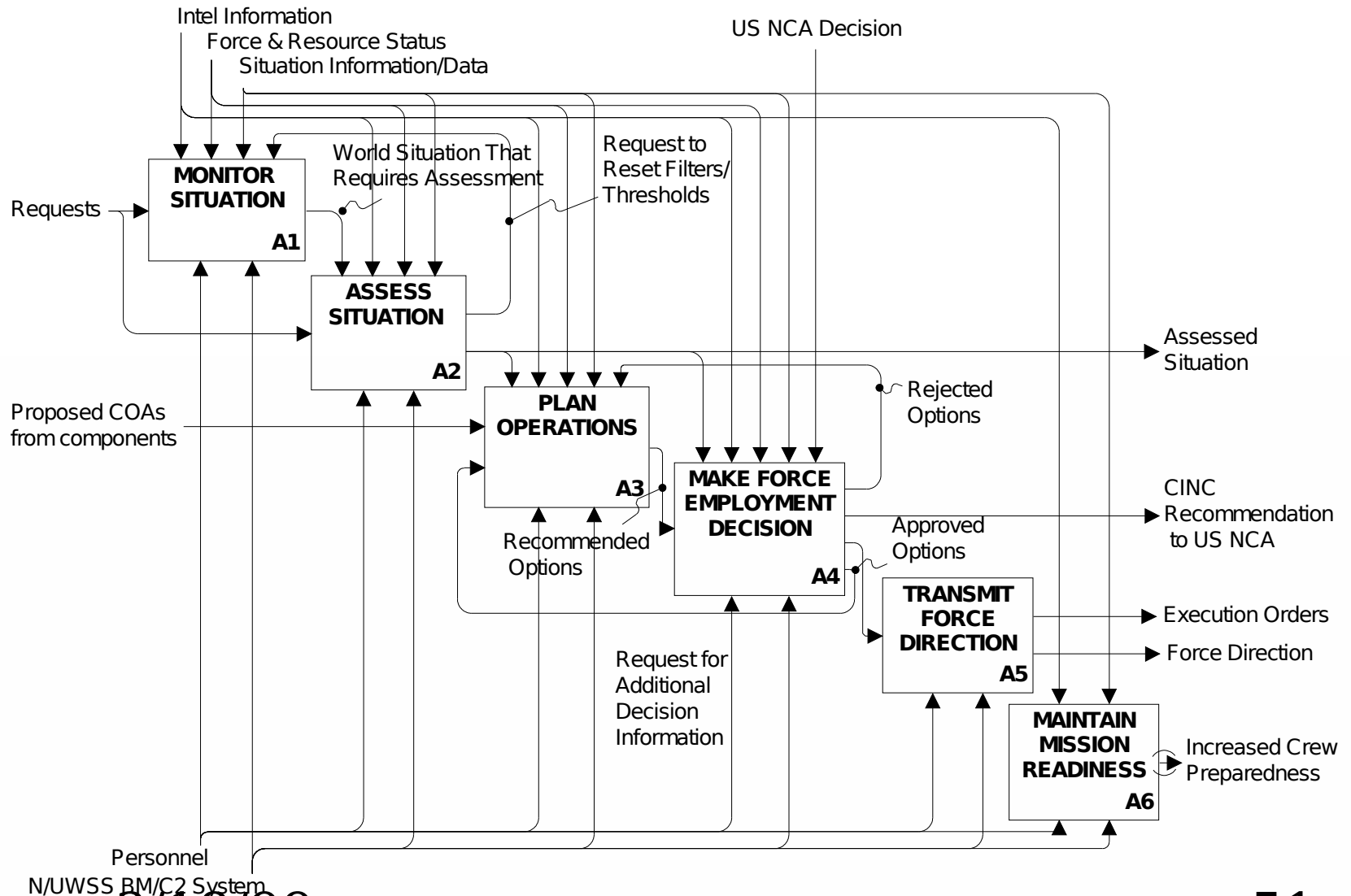
SND C2 SPO

- Activity Diagram = All Functionality
- Use Cases = Boundary Behavior
- Node Connectivity = Logical Connectivity
- IER = Information Exchange Requirements Among Nodes



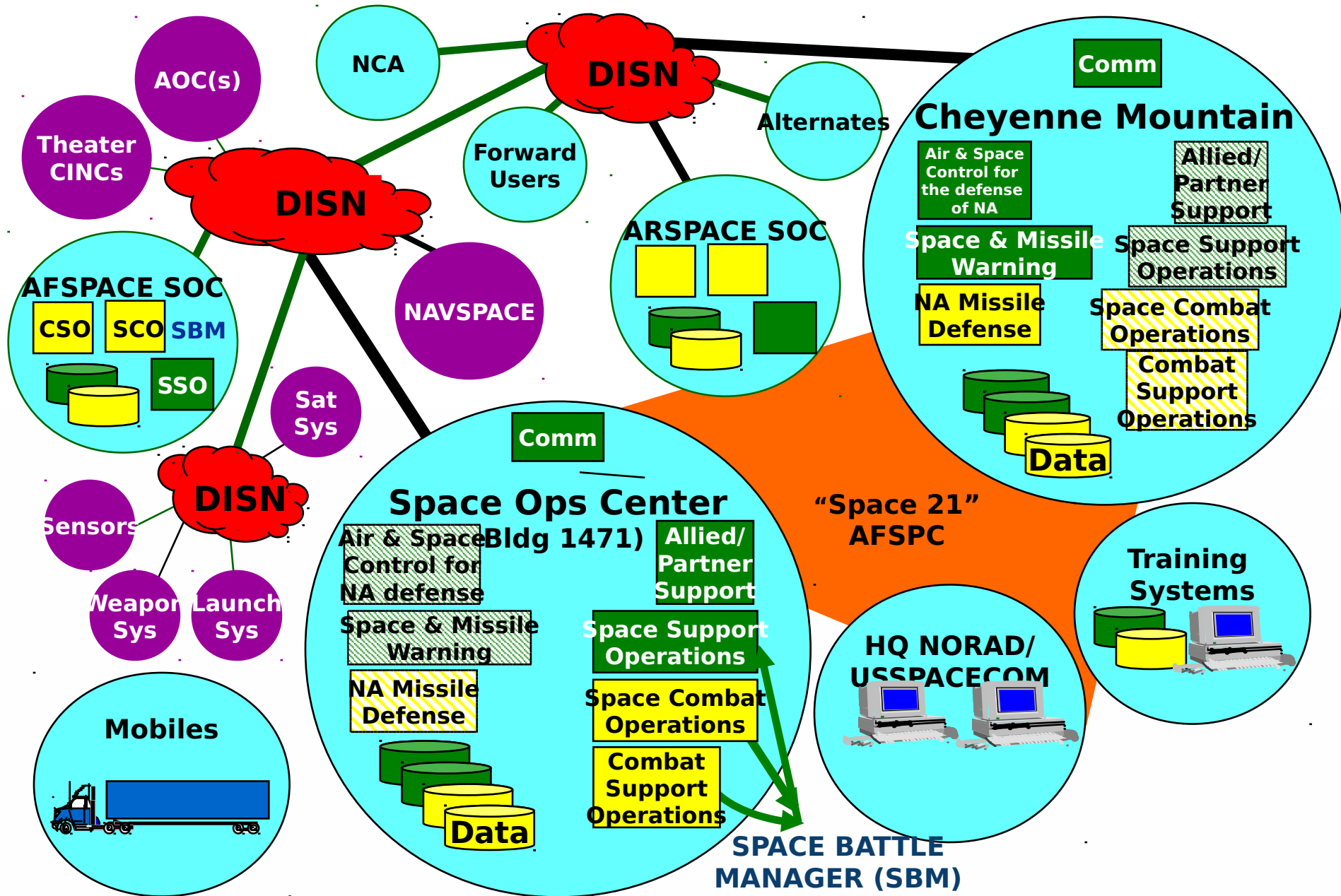
To-Be 2005 Activity Model

SND C2 SPO



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ISC2 Operations Center Interfaces



SND C2 SPO

[illegible]

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GCCS Joint Aerospace

Applications

SND C2 SPO

Joint
C/S/A Unique
Applications

Business
Applications

Functional
Applications

JOINT/CINCPAC
Applications

Service C2
Applications

Intelligence
Applications

A Portion of this is GCCS -

AF Responsibility for GCCS Joint Aerospace

Comba

Spac

Mobilit

Stra

Info

SOF

Othe

Other
Service
IAA

Cross Mission Common Applications

Cooperative Confederation of Developments

Standard Application Program Interfaces

Developer's
Kit

Alerts

Message
Processing

Correlation

Office
Automation

MCG&I

Data
Access

On-Line Help

COMMON SUPPORT APPLICATIONS

Presentation

Management

Communications

Distributed
Computing

Presentation
& Web

Data & Object
Management

INFRASTRUCTURE SERVICES

MIT X-
WINDOWING
X11R5

MOTIF

DNS

NEWS-
PRINT

NIS+

Executive
Manager

Security/
System
Management

KERNEL

Operating System

Other
Files

Intel
DB

Combat
Support
DB's

Tactical
Specific
DB's

Strategic
Specific
C2 DB's

Databases

C
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